

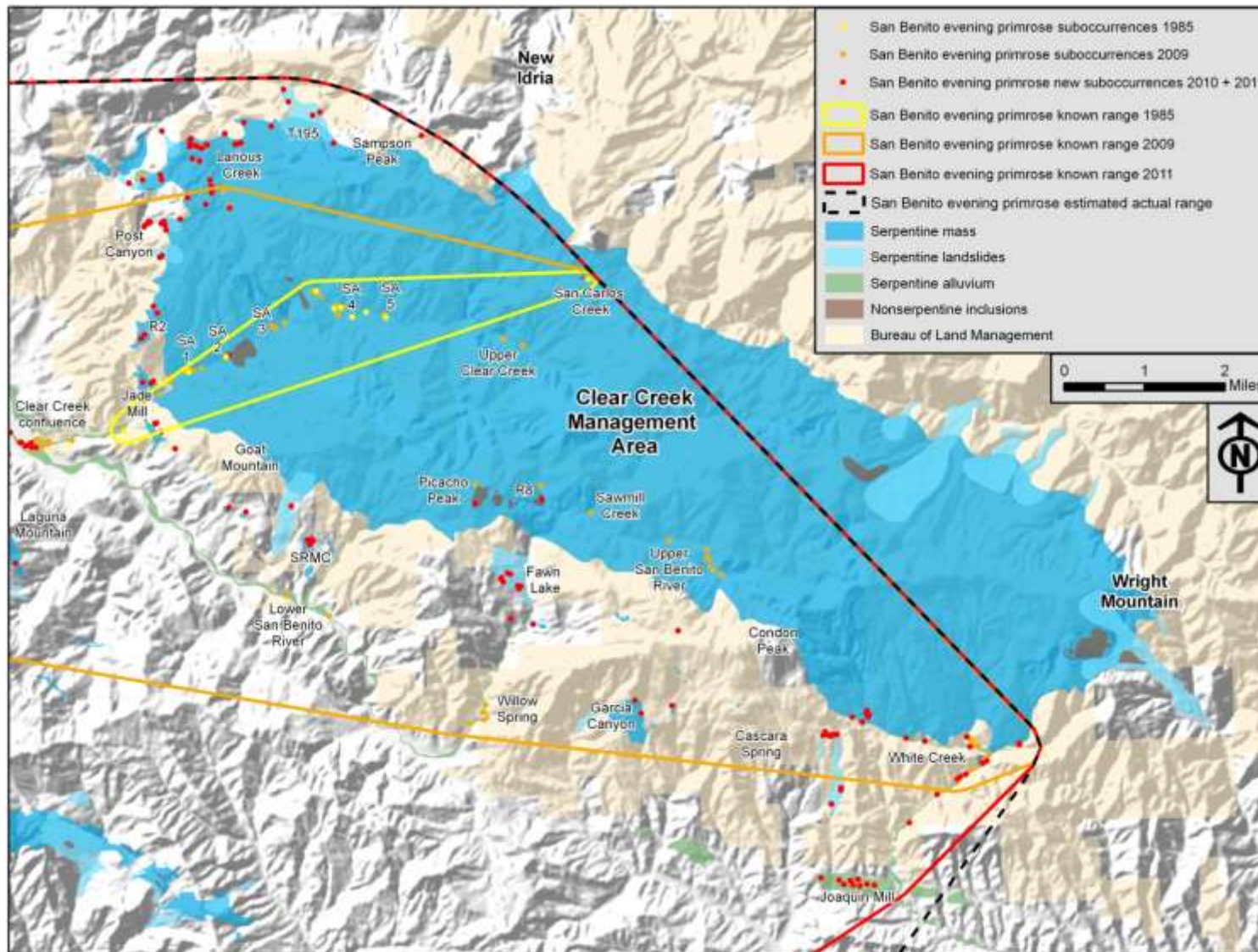
## Appendix IV - *Camissonia benitensis* Compliance Monitoring & Adaptive Management Plan

### 1.0 Introduction

San Benito evening primrose (*Camissonia benitensis*) is a federally-listed Threatened plant species which occurs on Bureau of Land Management (BLM) public lands in the Clear Creek Management Area (CCMA). The Endangered Species Act requires that all Federal agencies ensure that management actions do not jeopardize the continued existence of any threatened or endangered species.

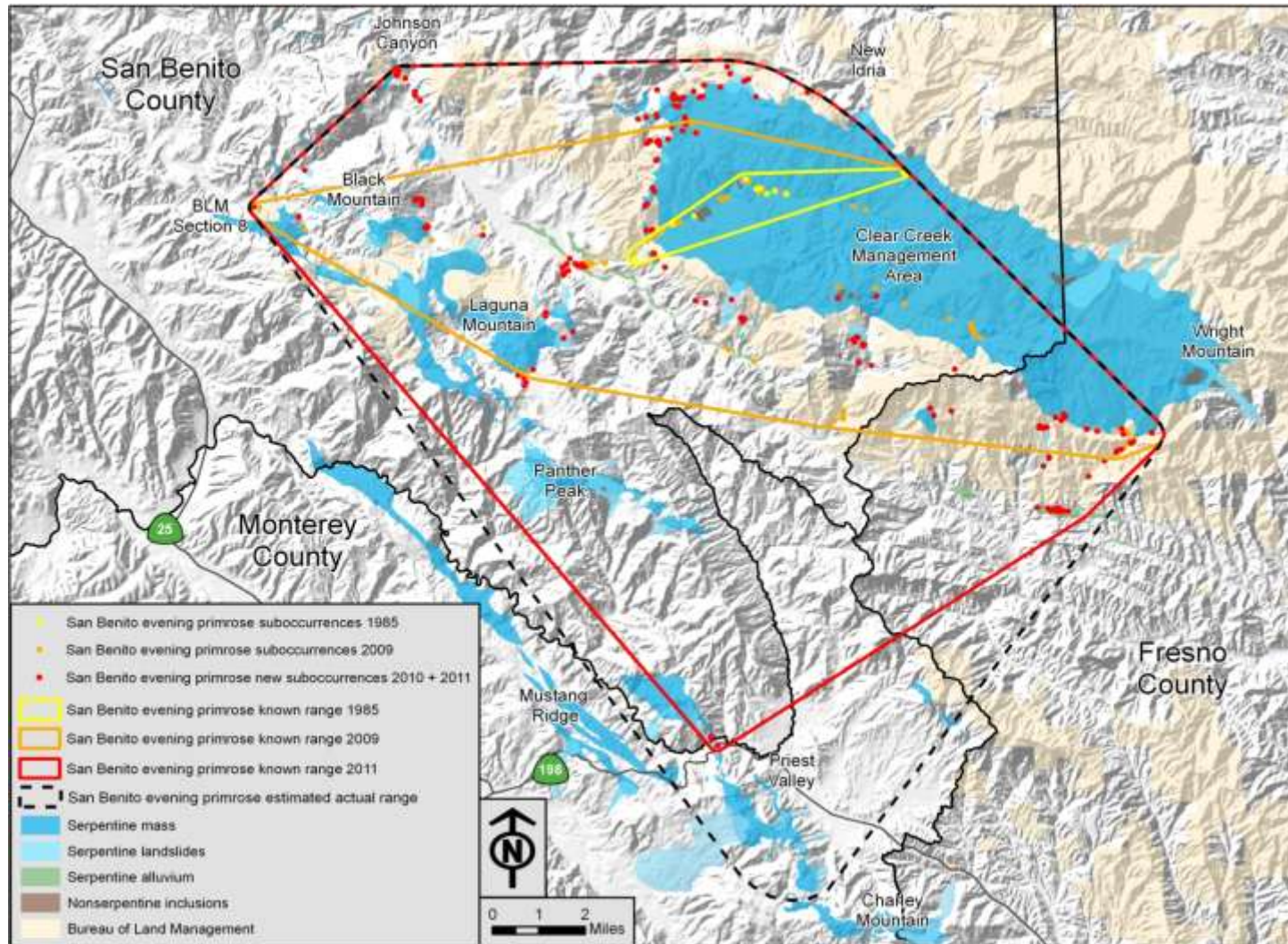
San Benito evening primrose is a strict serpentine (ultramafic rock) endemic found on serpentine alluvial stream terraces and on the margins of tectonic serpentine masses and serpentine landslides (serpentine geologic transition zone) in southern San Benito county, western Fresno county, and eastern Monterey county, California (BLM 2010). Only 10 suboccurrences of San Benito evening primrose were known at the time of federal listing in 1985 (USFWS 1985; **Figure IV-1**). The primary threat to the species identified at listing was Off-Highway Vehicle (OHV) impacts. Additional identified threats included other recreational activities (camping and rockhounding/mineral prospecting), road construction and maintenance, and gravel mining. Most of the suboccurrences known at the time of listing were located in the vicinity of heavily-impacted OHV areas (staging areas) on serpentine alluvial stream terraces in Clear Creek Canyon within Clear Creek Management Area (CCMA; Kiguchi 1985). Serpentine alluvial stream terraces were believed to be the only habitat type for the species. By 2009, all serpentine alluvial stream terrace habitat in the Clear Creek Management Area had been exhaustively surveyed for San Benito evening primrose, resulting in a total of 64 known natural suboccurrences (BLM 2009; **Figure IV-1**). Five of the 64 suboccurrences were (re)introductions made in 1990 and 1991 (Taylor 1993). Additionally, another six suboccurrences were introduced (new introductions) in 2008 for a total of 70 suboccurrences (BLM 2009). Many miles of fence and pipe barriers had been constructed to prevent OHV impacts to San Benito evening primrose and an OHV route designation (BLM 2006) further reduced OHV impacts.

The discovery that San Benito evening primrose also grows on serpentine geologic transition zone habitat (edges of tectonic serpentine masses and serpentine landslides; uplands) in 2010, followed by intensive survey of that habitat type on both BLM and private land resulted in the discovery of another 295 natural suboccurrences for a total of 361 suboccurrences known by 2011 (5x increase from 2009; BLM 2010; **Figure IV-1**). New suboccurrence finds on private lands doubled the known species range (**Figure IV-2**). Of the 361 total suboccurrences known, 196 suboccurrences are located within CCMA and 165 suboccurrences are located outside of CCMA (**Table IV-1**). Most of the newly discovered suboccurrences do not appear to have experienced any significant historic or recent human impacts, as a result of their location (largely outside of most areas intensively used by OHVs) and landscape position (often steep and brushy areas).



**Figure IV-1** Suboccurrences of San Benito evening primrose within and in the vicinity of Clear Creek Management Area.





**Figure IV-2** Previously known ranges, current known range, and estimated actual range of San Benito evening primrose. Estimated actual range is based upon field surveys of potential habitat.

**Table IV-1** Number of currently known San Benito evening primrose suboccurrences, habitat type, location, and land ownership.

# suboccurrences	Habitat type					Location				Land ownership	
	Alluvial terrace	Geologic transition	Terrace & transition	Rock outcrop		CCMA		Serpentine ACEC		BLM	Private
				Serpentine	Shale	Inside	Outside	Inside	Outside		
	36	276	42	2	5	196	165	135	226	157	204

The San Benito evening primrose Compliance Monitoring and Adaptive Management Plan will improve the BLM’s ability to manage CCMA in a manner that promotes the long-term conservation of San Benito evening primrose and makes efficient use of staffing and funding. This document outlines specific actions and refines the protocol to be used in monitoring San Benito evening primrose occupied and potential habitat areas within CCMA. This monitoring program documents disturbance to San Benito evening primrose habitat by tracking the type and intensity of threats to the species and its habitat to assess the status of the species over time and determine if adaptive management is needed.

This monitoring program builds upon existing BLM documents and strategies that have established protocol for compliance monitoring and FWS Biological Opinions for San Benito evening primrose within CCMA (BLM 1997a, 1997b, 2003, 2005, 2006; USFWS 1997, 2005).

## **2.0 Definitions**

### **2.1 Population Terminology**

**Population:** Traditionally, a plant population has been defined as a group of individuals of the same species occupying an area of habitat small enough to permit interbreeding among all members of the group (Barbour et al. 1998; Silvertown and Charlesworth 2001). This can be referred to as the biological population definition. Due to the difficulty in circumscribing a biological population, biologists have more recently departed from the traditional biological population definition and now define a population without the criteria of interbreeding. This definition of a population is particularly applicable to San Benito evening primrose since the species is almost exclusively self-pollinating (Taylor 1990). California Natural Diversity Database dispensed of the term “population” and now uses the term “occurrence” instead (as defined below). The terms “occurrence” and “suboccurrence”, therefore, are used to describe groups of populations and a single population, respectively, of San Benito evening primrose.

**Occurrence:** Equivalent to a group of populations. An occurrence is comprised of more than one suboccurrence of San Benito evening primrose that are all located within ¼ mile of each other.

**Suboccurrence:** Equivalent to a single population. A suboccurrence is a group of San Benito evening primrose plants that occur within a specific localized area differing noticeably in habitat characteristics (slope, aspect) from any other group of San Benito evening primrose plants within the same occurrence. There are currently 361 known suboccurrences of San Benito evening primrose of which, 196 are located within CCMA. 186 of the 196 known suboccurrences within CCMA were monitored in 2011. Only 92 of the 196 suboccurrences within CCMA are assigned



a number designating occurrence-suboccurrence relationship to other suboccurrences. The other 104 suboccurrences discovered in CCMA in 2010 and 2011 are known only by global positioning satellite (GPS) coordinates of their locations.

## **2.2 Habitat Terminology**

Serpentine alluvial stream terrace: Alluvial terrace created by the deposition of primarily serpentine sediment, adjacent to a stream or river channel (**Figure IV-3**). Serpentine alluvial stream terraces are topographically limited to low points (valleys) as a result of their depositional setting. San Benito evening primrose typically grows on older serpentine alluvial stream terraces where there is no longer active sediment deposition or significant erosion (stable).



**Figure IV-3.** Serpentine alluvial stream terrace. Serpentine alluvium eroded from the New Idria serpentine mass (visible in upper right corner) was carried by White Creek (visible at far right) and deposited on the stream bank as a terrace. San Benito evening primrose grows on the serpentine alluvial stream terrace.

Serpentine geologic transition zone: Geologic boundary between serpentine and non-serpentine rocks (sedimentary or non-ultramafic, metamorphic). The boundary may exist 1) between tectonic serpentine masses and non-serpentine rocks (**Figure IV-4**), 2) between serpentine landslides originating from tectonic serpentine masses and non-serpentine rocks, or 3) between ancient (>10,000 year old) serpentine alluvial deposits (elevated on hillslopes) and non-serpentine rocks. There is no topographic position limit for serpentine geologic transition zone. It can occur in valleys, on hillslopes, or high on ridges. Vegetation type often dramatically changes at the geologic transition zone from dense chaparral to sparse chaparral or blue oak woodland. San Benito evening primrose grows on serpentine soils in open gaps of woody vegetation at the edges of tectonic serpentine masses and serpentine landslides in the serpentine geologic transition zone.



**Figure IV-4.** Serpentine geologic transition zone. Serpentine (blue, barren substrate) interfaces with non-serpentine rocks (supporting dense annual grassland and blue oak woodland). San Benito evening primrose grows on the barren serpentine substrate.

Occupied habitat: The area occupied by a suboccurrence. 92 suboccurrences of San Benito evening primrose are assigned a suboccurrence number with the extent of occupied habitat digitally mapped in geographic information systems (GIS). The other 104 suboccurrences have not been assigned a number and are only known only by GPS coordinates of their locations with the extent of occupied habitat mapped in GIS.

Potential habitat: Localized areas of serpentine alluvial stream terraces and serpentine geologic transition zone judged to have habitat conditions conducive to supporting San Benito evening primrose. Most potential habitat of San Benito evening primrose within CCMA and other areas within its known range has been mapped in GIS. Areas of potential habitat are generally, but not always, adjacent to occupied habitat. Conditions conducive to supporting San Benito evening primrose have been determined from observations of habitat conditions present where the species has been found. Conducive habitat conditions include: 1) serpentine soil on stream terraces (serpentine alluvial stream terrace habitat) or at the edges of tectonic serpentine masses and serpentine landslides (serpentine geologic transition zone habitat), 2) woody vegetation with open gaps, 3) presence of other common indicator companion herbaceous species to San Benito evening primrose, and 4) low density of invasive annual herbaceous plant species (Taylor 1990; USFWS 2006; BLM 2010). San Benito evening primrose has been found on two other distinct habitat types including serpentine rock outcrops (2 suboccurrences) and shale outcrops/barrens (5 suboccurrences) within- or close proximity to the New Idria serpentine mass (BLM 2010). The rock outcrops have habitat conditions similar to geologic transition zone habitat, but it is unclear what additional specific habitat conditions on rock outcrops dictate whether they are conducive to supporting San Benito evening primrose. Due to this uncertainty, no potential habitat has been mapped for serpentine rock outcrops or shale rock outcrops/barrens.

## **2.3 Noncompliance Terminology**

Baseline: Baseline conditions noted the previous monitoring visit. The habitat conditions documented during the previous monitoring visit are the baseline for the following monitoring visit.

Non-compliance: Motorized and non-motorized trespass and unauthorized use in occupied and/or potential habitat.

Incident: A non-compliant incident is unauthorized human disturbance (impact) to habitat that is observed and is a change from the previous monitoring visit. Each visit is relative to the baseline condition from the previous monitoring visit.

Disturbance: Disturbance (impacts) to San Benito evening primrose occupied and/or potential habitat resulting from human activities. Disturbances can directly impact San Benito evening primrose by damaging plants or degrading their habitat. Motorized disturbance sources (**Table IV-2**) include, but are not limited to: automobiles (full-sized vehicle), all-terrain vehicles (ATVs; quads; four wheelers), utility vehicles (UTVs; side by sides), motorcycles (primarily dirt bikes), and tractors (tracked vehicles; caterpillars). OHV disturbances are the most common human disturbance to San Benito evening primrose at CCMA and the primary threat for which

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the species was listed (USFWS 1985). Non-motorized disturbance sources (**Table IV-3**) include, but are not limited to: bicycles (primarily mountain bikes) and other non-motorized vehicles, camping, rockhounding/mineral prospecting, logging/wood cutting, concentrated human foot traffic (trailing), concentrated livestock traffic (trailing), and waste (garbage) dumping. The primary habitat disturbances (immediate impacts) from single incidents of motorized and non-motorized activities are soil surface disturbance (tracks), soil subsurface disturbance (in the case of activities involving digging), and vegetation damage and/or removal. Multiple incidents of these disturbances (depending on type, intensity, and degree of localization), can result in greater chronic (long-term) habitat impacts including soil compaction, soil erosion, and areas denuded of vegetation.

**Table IV-2.** Motorized disturbance sources and primary habitat impacts.

Impact↓	Disturbance source→	Automobile	ATV/UTV	Motorcycle	Tractor
Soil surface (tracks)		X	X	X	X
Soil subsurface (digging)					X
Vegetation (damage/removal)		X	X	X	X

**Table IV-3.** Non-motorized disturbance sources and primary habitat impacts.

Disturbance source→	Bicycles & other non-motorized vehicles	Camping	Rock hounding/mineral prospecting	Logging/wood cutting	Concentrated human foot traffic (trail)	Concentrated livestock traffic (trail)	Waste dumping
Impact↓							
Soil surface (tracks)	X	X	X	X	X	X	X*
Soil subsurface (digging)			X				
Vegetation (damage/removal)	X	X	X	X	X	X	

\*material surface occupancy and/or chemical contamination

It should be noted that not all human disturbances are regarded as adverse to San Benito evening primrose. There is strong evidence that some light to moderate level of human disturbance is beneficial to San Benito evening primrose (BLM 2009). Several San Benito evening primrose suboccurrences coincide with several prehistoric (Native American) and historic (European settler) human habitation sites on serpentine alluvial stream terraces (BLM 2009). Human habitation at those sites has been judged to have been beneficial to San Benito evening primrose through the removal of woody vegetation (reduction of plant competition) and increase in soil fertility (increased organic matter content). In addition to modifying vegetation and soils to promote San Benito evening primrose, humans may have also played a role in the dispersal of the species. The seeds of San Benito evening primrose are as small as grains of sand and may be dispersed in mud stuck to humans, livestock, and vehicles. Livestock grazing may be beneficial to San Benito evening primrose by removing competing vegetation. Wildfire is beneficial to San Benito evening primrose by removing competing vegetation (BLM 2009). Prescribed fire used by the BLM to control invasive yellow starthistle (*Centaurea solstitialis*) at the confluence of Clear Creek and San Benito River has resulted in the (re)colonization of San Benito evening primrose in that area.



### **3.0 Habitat and Compliance Monitoring Program**

The monitoring year for San Benito evening primrose begins June 1 and ends June 1 the following year. Minimum habitat and compliance monitoring frequency will occur annually (coincident with plant counts). Monitoring frequency may be increased in response to increased visitor use and/or increased incidence of non-compliance.

#### **3.1 Plant Counts**

Plant counts will be conducted annually April – May (peak flowering). San Benito evening primrose can have large variation (up to four orders of magnitude) in the number of plants from year to year. San Benito evening primrose plants will be directly counted for each suboccurrence monitored where suboccurrences are 1000 plants in size or less. For suboccurrences 1000 plants in size or greater, if plant density is fairly even, the count for a small area can be extrapolated to the entire suboccurrence. If the distribution and density are uneven, estimates can be made based upon random plots.

#### **3.2 Habitat Condition and Compliance Monitoring**

San Benito evening primrose occupied and potential habitat monitoring will include documentation of significant human disturbances (impacts) as listed in **Table IV-2** and **IV-3**. Documentation of disturbances will include the following:

- Suboccurrence impacted (identify by suboccurrence number or GPS coordinate) and whether the disturbance occurred within occupied and/or potential habitat.
- Type (source) of disturbance.
- Intensity of disturbance. Description of the extent of the disturbance (number of tracks/trails; estimated area of disturbed soil and/or vegetation).
- Photodocumentation of the disturbance.

The BLM will respond to incidents of non-compliance with a hierarchical approach. Signs and barriers will be used in situations of low to moderate levels of noncompliance. Area closures may be enacted in situations of high levels of non-compliance (heavy, repeated impacts to numerous suboccurrences). Area closures will be determined in consultation with Ventura FWS. Any enacted closures within CCMA will be conducted in accordance with The Endangered Species Act of 1973, 43 CFR 8341.2, and 43 CFR 8341.1.

### **Endangered Species Act of 1973**

(d) Protective Regulations.- Whenever any species is listed as a threatened species pursuant to subsection (c) of this section, the Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation of such species. The Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2) in the case of plants, with respect to endangered species; except that with respect to the taking of resident species of fish or wildlife, such regulations shall apply in any State which has entered into a cooperative agreement pursuant to section 6(c) of this Act only to the extent that such regulations have also been adopted by such State.

### **43 CFR 8341.2 Special Rules**

(a) Notwithstanding the consultation provisions in Sec. 8342.2(a), where the authorized officer determines that off-road vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the authorized officer shall immediately close the areas affected to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. Such closures will not prevent designation in accordance with procedures in subpart 8342 of this part, but these lands shall not be opened to the type(s) of off-road vehicle to which it was closed unless the authorized officer determines that the adverse effects have been eliminated and measures implemented to prevent recurrence.

(b) Each State director is authorized to close portions of the public lands to use by off-road vehicles, except those areas or trails which are suitable and specifically designated as open to such use pursuant to subpart 8342 of this part.

### **43 CFR 8364.1 Closure and Restrictions**

(a) To protect persons, property, and public lands and resources, the authorized officer may issue an order to close or restrict use of designated public lands.

(b) Each order shall:

- (1) Identify the public lands, roads, trails or waterways that are closed to entry or restricted as to use;
- (2) Specify the uses that are restricted;
- (3) Specify the period of time during which the closure or restriction shall apply;
- (4) Identify those persons who are exempt from the closure or restrictions;
- (5) Be posted in the local Bureau of Land Management Office having jurisdiction over the lands to which the order applies;
- (6) Be posted at places near and/or within the area to which the closure or restriction applies, in such manner and location as is reasonable to bring prohibitions to the attention of users;
- (7) Include a statement on the reasons for the closure; and

(c) In issuing orders pursuant to this section, the authorized officer shall publish them in the Federal Register.

(d) Any person who fails to comply with a closure or restriction order issued under this subpart may be subject to the penalties provided in Sec. 8360.0–7 of this title.

### 3.3 Reporting

Monitoring reports will be generated annually and submitted to the Ventura FWS. The report will summarize ongoing management to protect San Benito evening primrose suboccurrences and potential habitat on BLM land within CCMA.

Reports will include the following:

- Suboccurrence monitoring data including plant counts
- Inventory results of surveyed habitat
- Habitat restoration summary
- Recovery research summary
- Compliance monitoring record
- Description and photos of non-compliance incidents
- Recommendations for changes in management to reduce non-compliance and promote recovery of the species

### 4.0 Adaptive Management

The following measures can be implemented to increase protection of San Benito evening primrose habitat from unauthorized activities if compliance monitoring indicates that existing protection is insufficient to control impacts to habitat. The protection measures should be applied with respect to the specific unauthorized activity and the location where the unauthorized activity is occurring. The measures should be applied in a stepwise process.

1. **Site Monitoring** - Increase frequency of monitoring at specific suboccurrences experiencing chronic non-compliance.
2. **Signing** - Increase signing. Sign for educational and law enforcement purposes (i.e. Vegetation Study Area and Closed Area) unless vandalism is a risk.
3. **Fencing** - Continued non-compliance will determine if barrier installation (fence or pipe) is necessary. Wire fencing provides an effective, lower cost option to exclude unauthorized human activities from protected areas. This type of barrier, however, is often more susceptible to vandalism (fence cutting and damage from OHVs) than robust, steel pipe barriers.
4. **Pipe barrier** – Pipe barrier is constructed from welded segments of 2.5” diameter steel pipe. Pipe barrier installation is substantially more expensive to install than wire fencing, but its robust construction provides greater protection of sensitive areas, particularly from motorized vehicles which are capable of damaging wire fences.
5. **Closures** - Close trails, sub-watersheds, entire watersheds and larger areas, or the entire CCMA when monitoring shows continued non-compliance in San Benito evening primrose occupied and potential habitat on BLM managed lands. Closures at the sub-watershed and larger areas will be determined in consultation with the FWS to determine appropriate adaptive management actions.



## **5.0 Annual review with the U.S. Fish and Wildlife Service**

The BLM will confer with the Ventura FWS on an annual basis to review monitoring data and what measures the BLM has taken to remedy any problems that were identified. The conference can initially be via e-mail and phone, though either party reserves the right to request an in-person meeting. If substantial disagreement arises between the agencies regarding appropriate management response to issues related to protection and conservation of San Benito evening primrose, the FWS may request that formal consultation be reinitiated.

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